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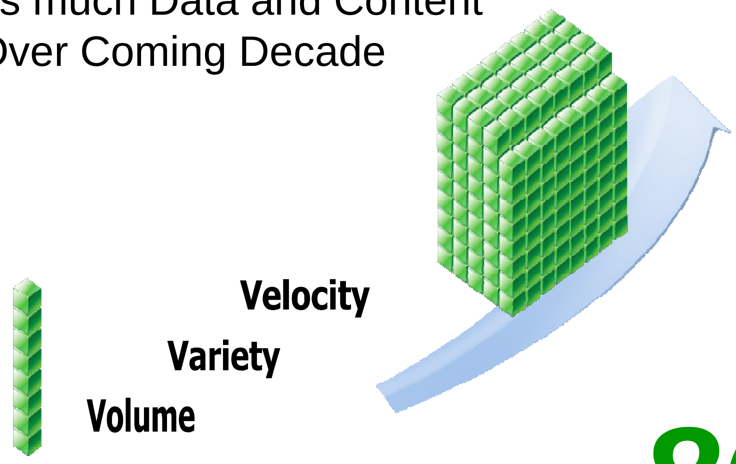
Cross Industry Big Data

Information is at the Center of a New Wave of Opportunity…

44x

as much Data and Content Over Coming Decade

2020
35 zettabytes



2009
800,000 petabytes

80%

Of world's data is unstructured

… And Organizations Need Deeper Insights

1 in 3 Business leaders frequently make decisions based on information they don't trust, or don't have

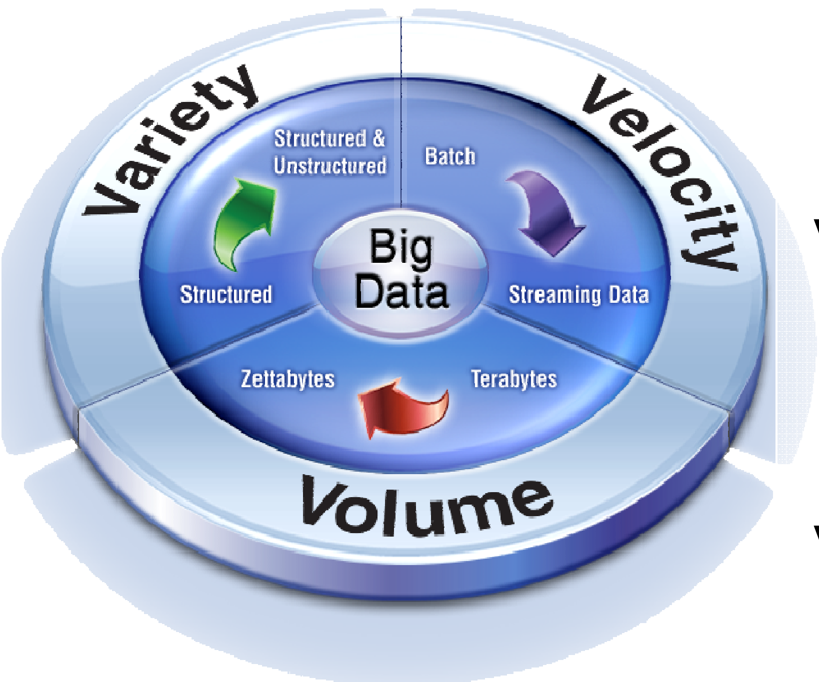
1 in 2 Business leaders say they don't have access to the information they need to do their jobs

83% of CIOs cited "Business intelligence and analytics" as part of their visionary plans to enhance competitiveness

60% of CEOs need to do a better job capturing and understanding information rapidly in order to make swift business decisions

Big Data Presents Big Opportunities

Extract insight from a high volume, variety and velocity of data in a timely and cost-effective manner



Variety: Manage and benefit from diverse data types and data structures

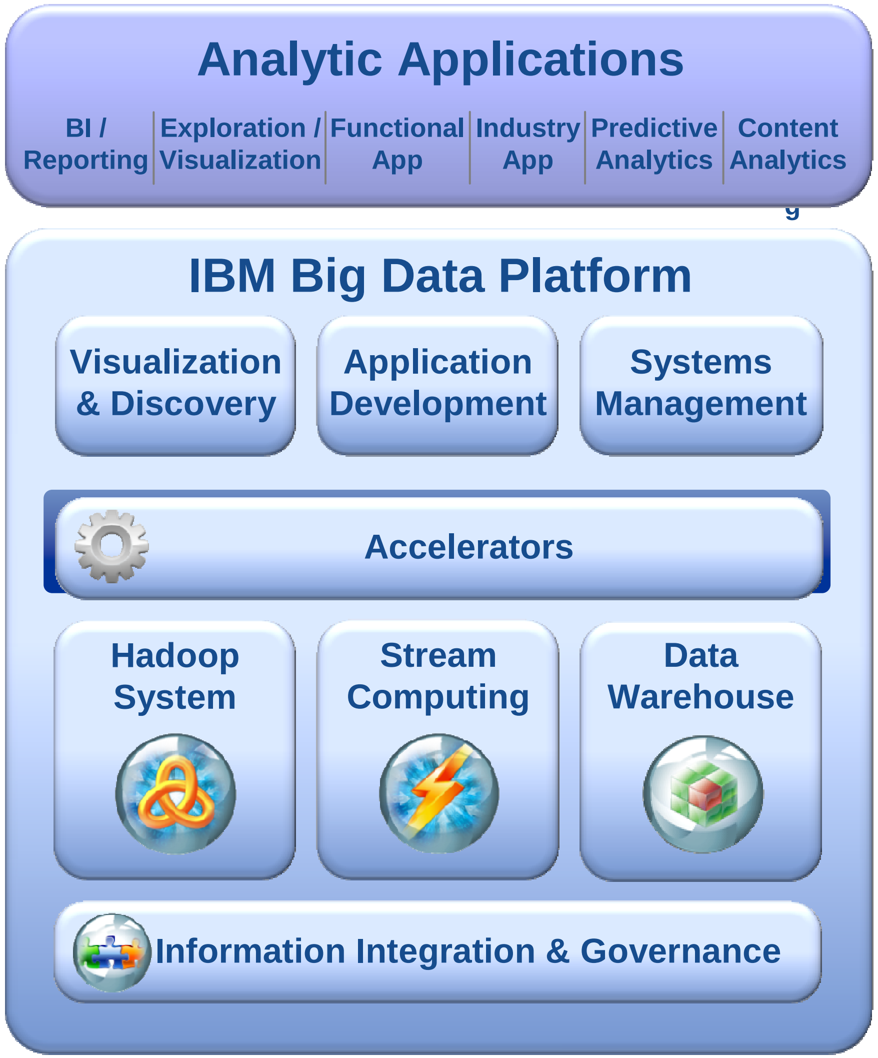
Velocity: Analyze streaming data and large volumes of persistent data

Volume: Scale from terabytes to zettabytes

IBM Big Data Strategy: Move the Analytics Closer to the Data

New analytic applications drive the requirements for a big data platform

- **Integrate and manage the full variety, velocity and volume of data**
- **Apply advanced analytics to information in its native form**
- **Visualize all available data for ad-hoc analysis**
- **Development environment for building new analytic applications**
- **Workload optimization and scheduling**
- **Security and Governance**



Big Data Scenarios Span Many Industries

Multi-channel customer sentiment and experience a analysis

Detect life-threatening conditions at hospitals in time to intervene

Predict weather patterns to plan optimal wind turbine usage, and optimize capital expenditure on asset placement

Managing and optimizing real-time multi-modal route planning

Identify criminals and threats from disparate video, audio, and data feeds

Smarter Wind Energy

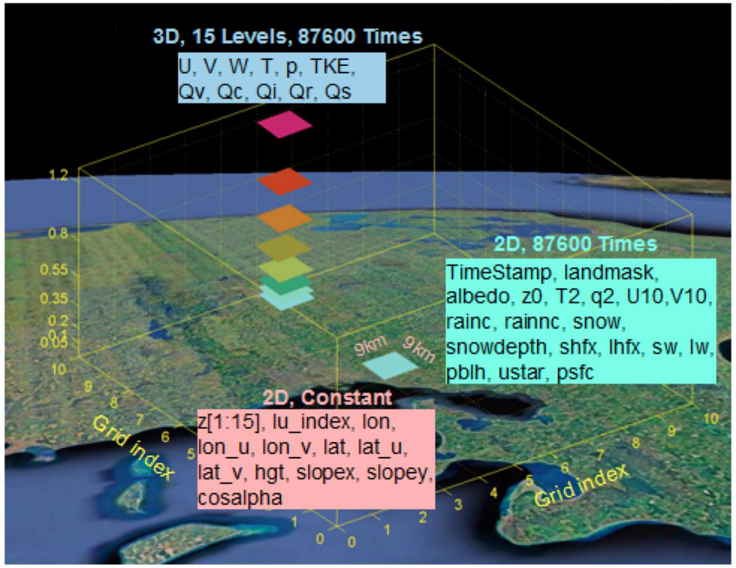
The Challenge

- European target - 20% Renewable energy by 2020
- Analyze large volumes of public and private weather data for alternative energy business
- Leverage large volume (2.8+ PB growing to 20 PB) of weather data to optimize placement of turbines – complex discipline
- Combat issues with volatile nature of wind – need to provide customers with confidence that placement site will yield a reliable source of energy – this require complex analytics

Complex Analytics – not just about how hard the wind blows

- Weather is very important to wind turbines!
  - Temperature
  - Snow / ice
  - Yield of the wind turbine over its life …
- They have their own meteorologists
  - They predict weather on their own
- They run a lot of weather simulations
- They have weather data from the entire world
  - For the last 10 years
  - 35,000 metrological stations worldwide
  - 2 PBytes of data

Data dimensions, 10 years, hourly, any grid resolution



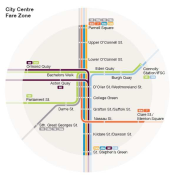
Results and Benefits

- Vestas customers need to build and validate strong business case (need predictability / reliability)
- Modeling time (posing and answering questions) has been reduced from 3 weeks to 15 minutes
- Solution is allowing efficient exploitation of 15,000 core cluster for multiple uses
- Solution provides for significant future scaling
  - Grid resolution
  - Data volumes
- Now investigating optimization of ongoing operations

Smarter Public Transport

The Challenge

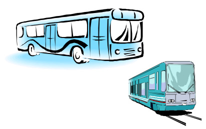
- Meet the demands of citizens across the city looking to utilize an array of public transportation options
- Optimize routing and scheduling of public transportation to meet passenger demand throughout the day and make effective use of the fleet
- Leverage complex network of sensors, route data and schedules to build a single holistic picture

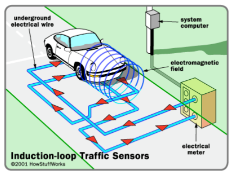

Routes & maps


Parking capacity


Car


Accessibility


Timetables



SCATS Induction loop


CCTV

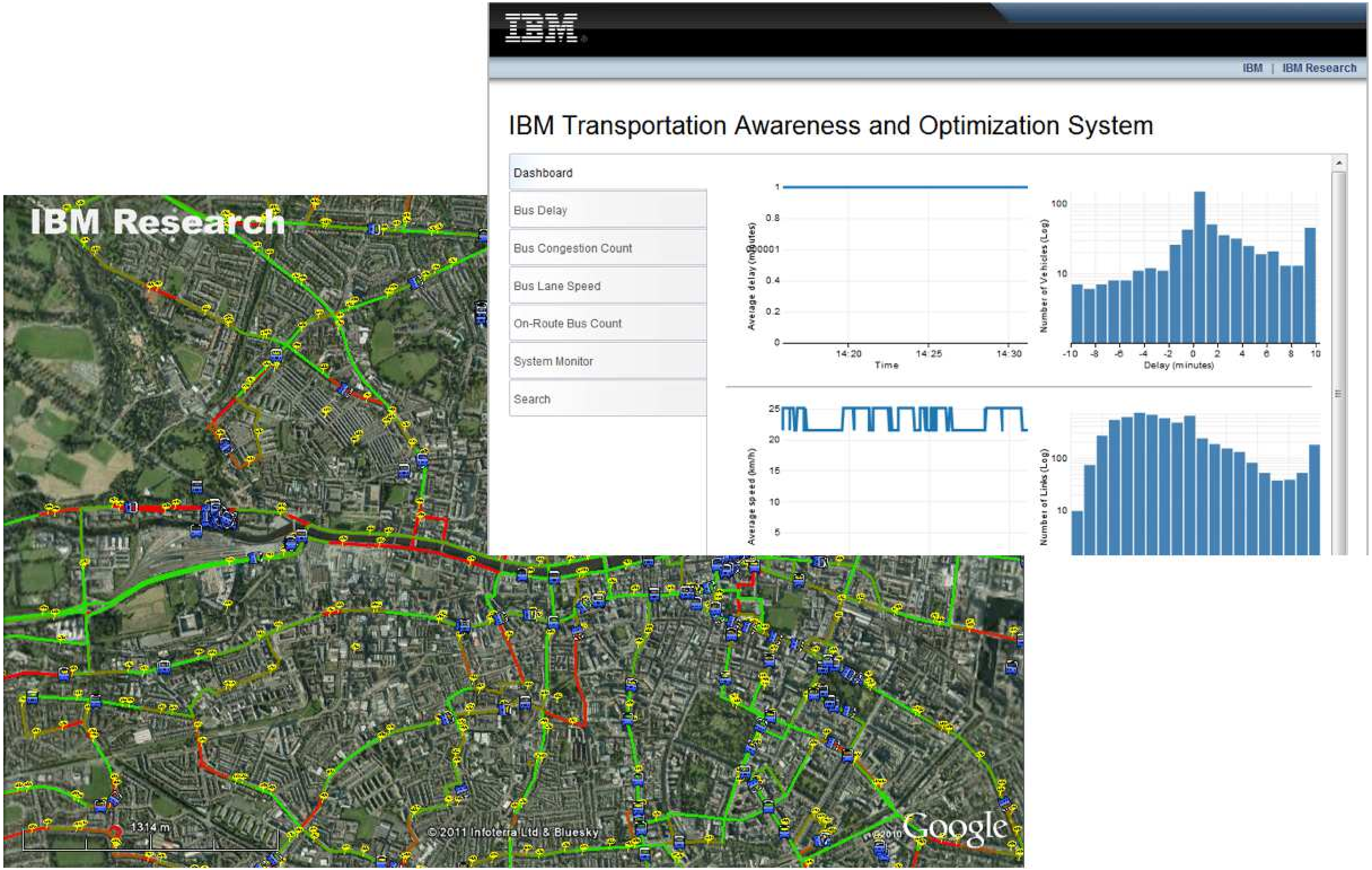

Bike

Complex Analytics

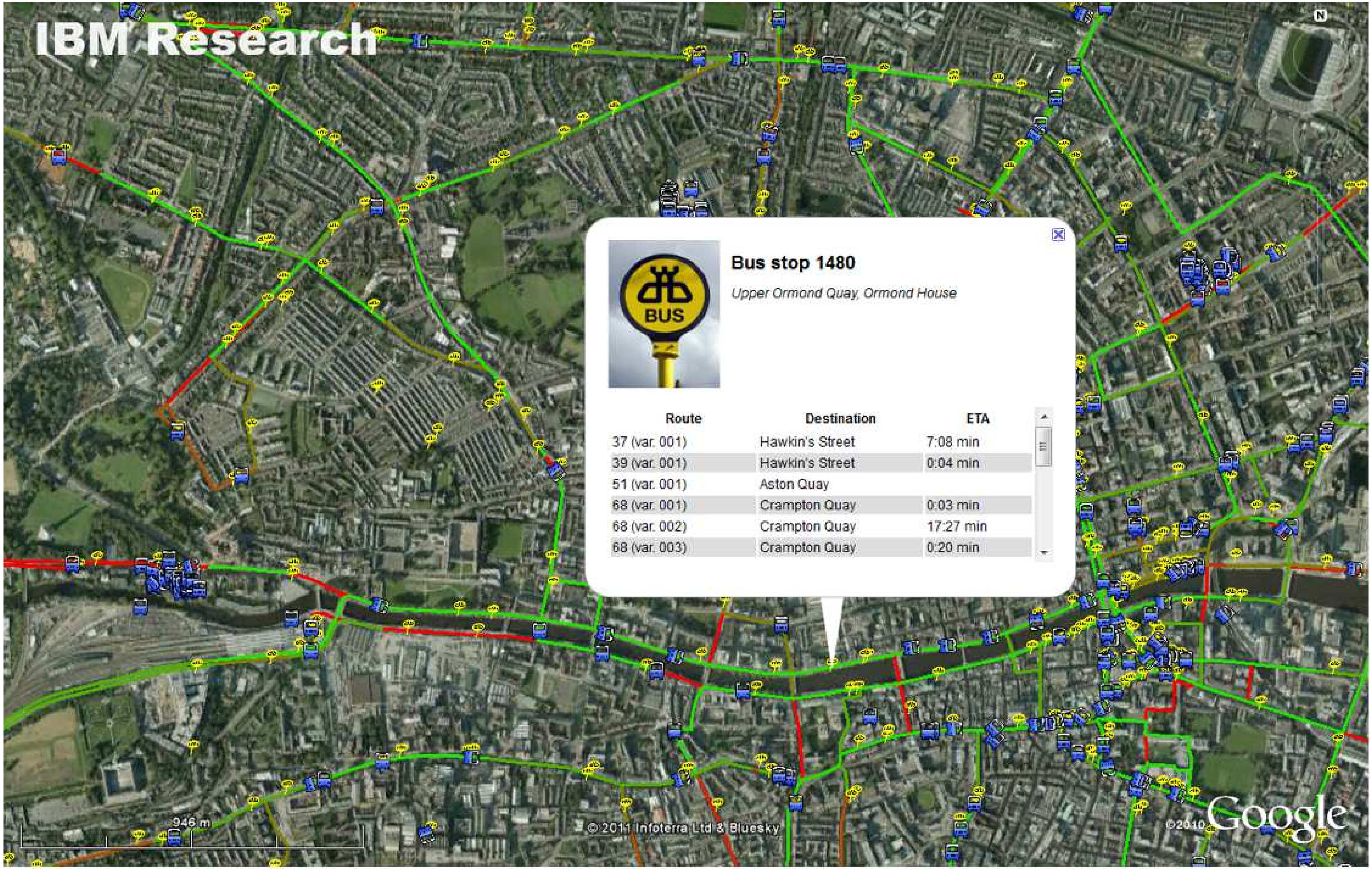
- High-Performance System and Analytics to:
- Assimilate: Subscription to & decoding of SIRI[1] real-time data feeds
- Mediate: De-noising, map matching & trajectory tracking
- and Aggregate: Extraction of key traffic metrics; e.g. speed

[1] SIRI is an XML protocol to allow distributed computers to exchange real-time information about public transport services and vehicles. The protocol is a CEN standard, developed and used by several EU countries
See http://leicestertravel.info/ or http://www.tfl.gov.uk/ for examples

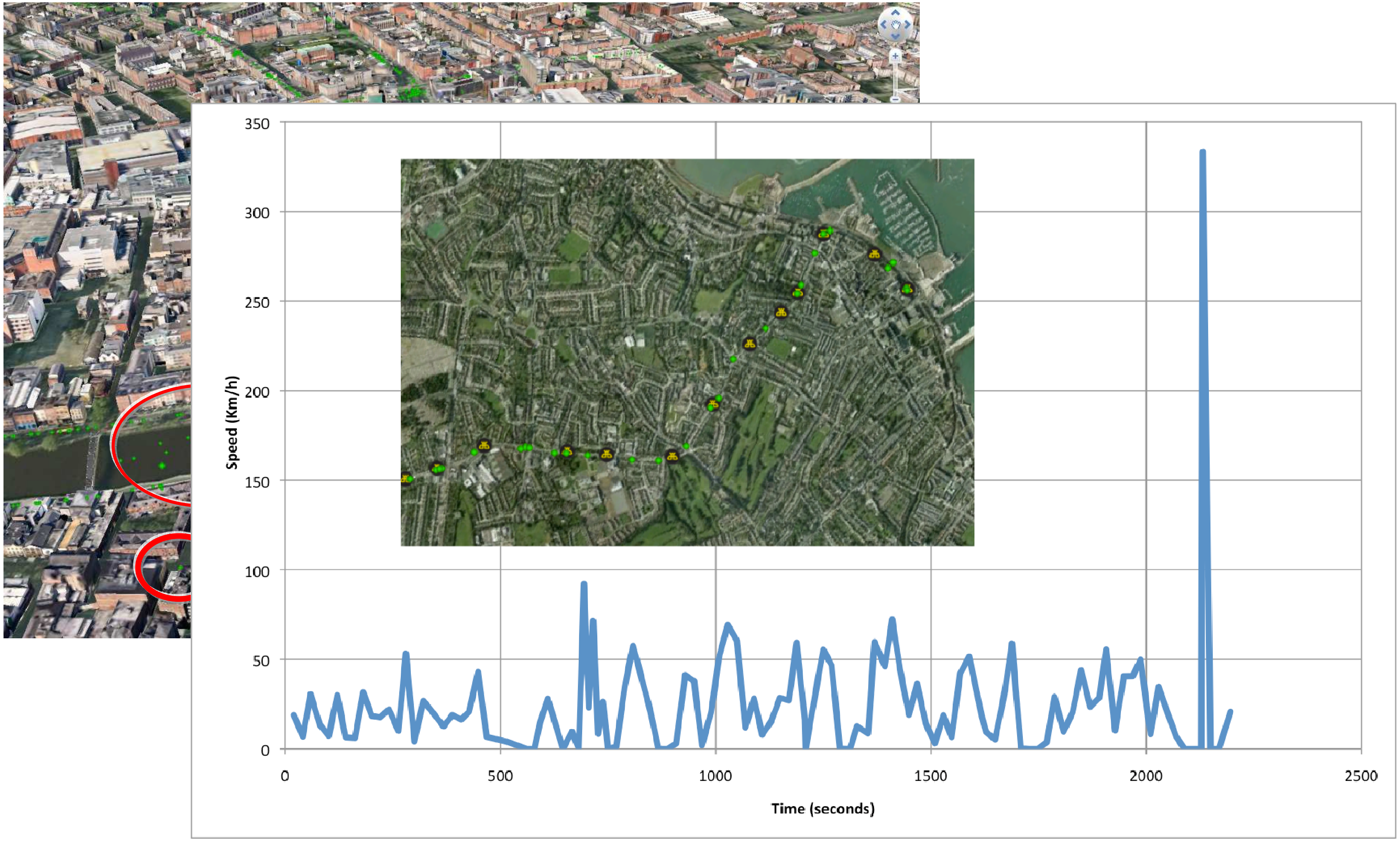
Screenshot #1



Screenshot #2

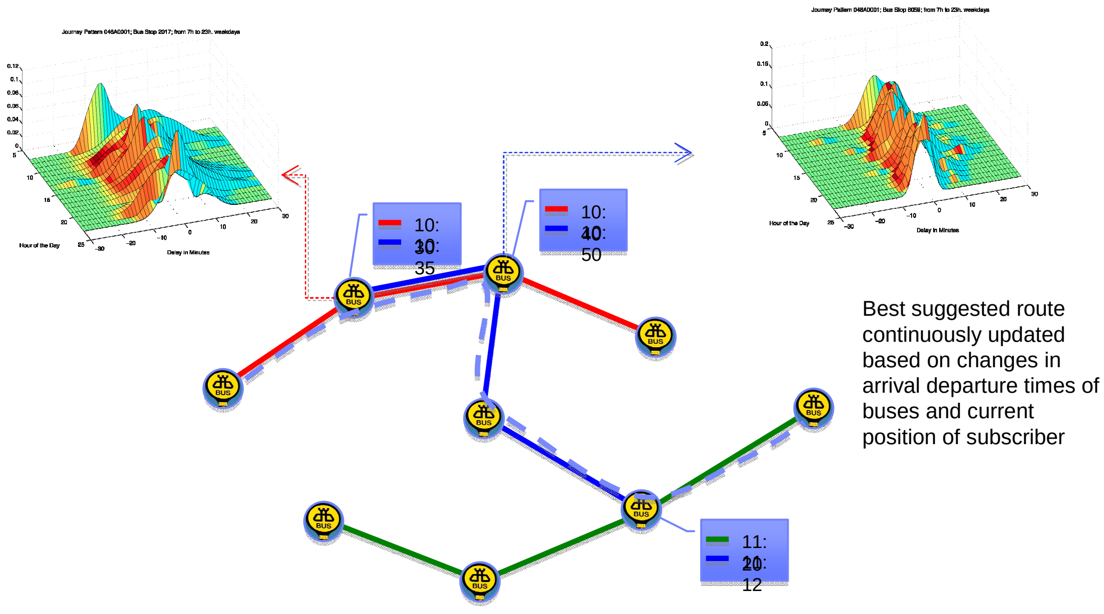


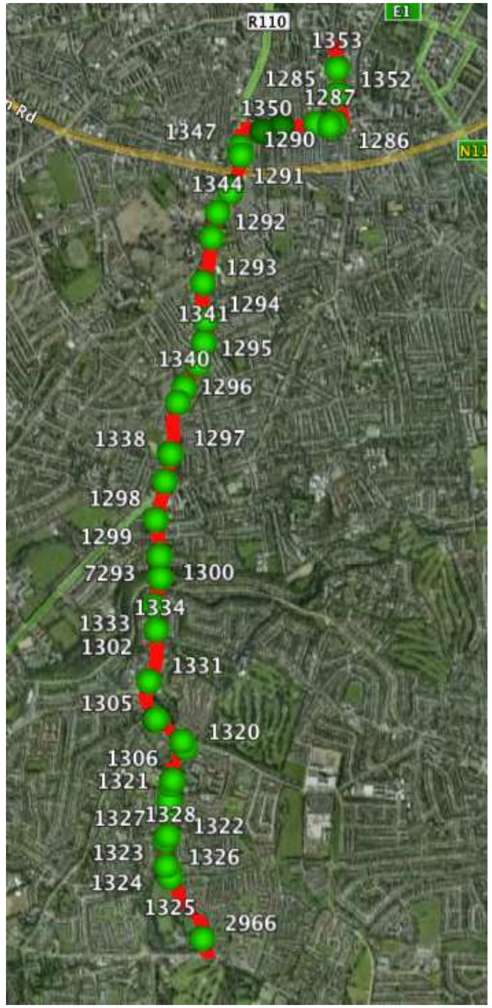
Real-time Sensor Data Challenges



Results and Benefits

- Real-time situational awareness
- Route optimisation – actuating the city
- Real-time multi-modal planning





THINK
BIG